

NACIMIENTO WATER PROJECT

Oak Tree Mitigation and Monitoring Plan

November 2006



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San Luis Obispo County Flood Control & Water Conservation District

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Prepared for:

Environmental Programs Division
Department of Public Works
County of San Luis Obispo



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NACIMIENTO WATER PROJECT

Oak Tree Mitigation & Monitoring Plan

1.0 Introduction

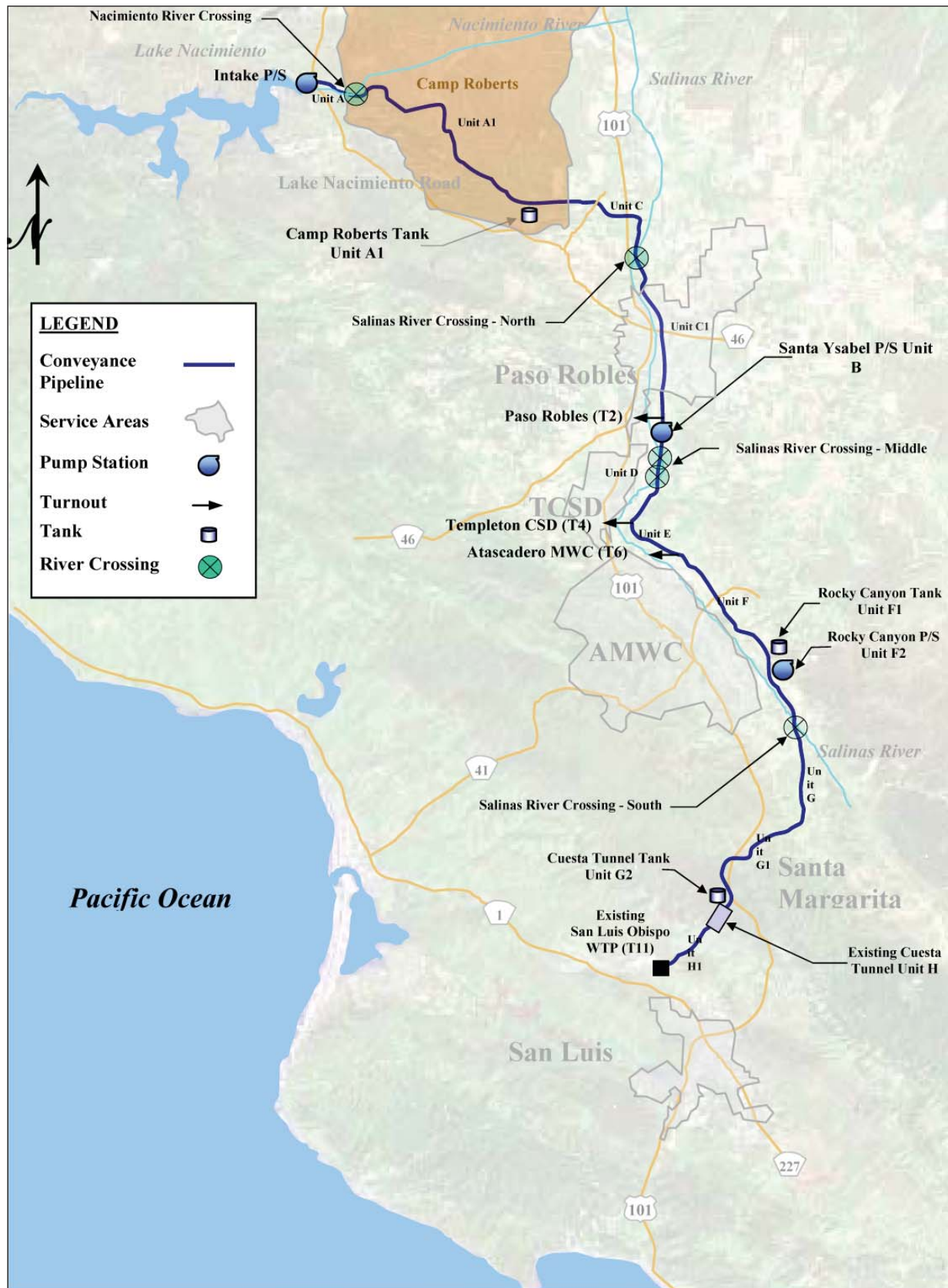
This Oak Tree Mitigation and Monitoring Plan (OTMMP) provides the guidelines for the implementation of mitigation and monitoring requirements as set forth in the Project's EIR (mitigation measure BR-10 in the Project EIR) for direct and indirect impacts to oak trees and oak woodlands from the implementation of the Nacimiento Water Project (NWP or Project). The San Luis Obispo County Flood Control and Water Conservation District (District) is proposing to construct a 45-mile pipeline from Lake Nacimiento to San Luis Obispo (see Figure 1), and Project activities will result in the trimming and removal of individual oak trees and oak woodland. Oak tree conservation must be considered under the California Environmental Quality Act (CEQA), as well as state law and local ordinances including the State Assembly Bill 242 (1999), San Luis Obispo County Oak Woodlands Management Plan (2003), and the City of Paso Robles Oak Tree Preservation Ordinance. This OTMMP outlines actions that will be taken by the District to protect, avoid and replace oak resources during the NWP.

1.1 Project Summary

The Nacimiento Water Project (NWP or Project) is designed to provide a reliable supplemental water source for a variety of uses within San Luis Obispo (SLO) County by supplementing the local ground and surface water supplies with a new surface water source. The SLO County Flood Control and Water Conservation District has a 17,500 afy entitlement from Lake Nacimiento per agreement executed in 1959 with Monterey County. Of this 17,500 af entitlement, 15,750 af is slated for this project, and the remaining 1,750 af is being reserved for local lakeside use. The amount of water currently contracted is 9,655 acre feet. This water will be transported south in a pipeline approximately 45 miles long with associated turnouts, pumping stations and other associated facilities. The NWP will be constructed within three broad physiographic regions: coastal mountains and valleys, interior mountains and valleys, and a coastal plain. Lake Nacimiento is located in the Santa Lucia coastal mountain range. Major water courses are the Nacimiento and Salinas rivers and Santa Margarita Creek. Major drainage basins include the Lake Nacimiento Watershed and the Salinas River.

1.2 Responsible Parties

San Luis Obispo County Flood Control and Water Conservation District
Public Works Department
County Government Center, Room 207
San Luis Obispo, CA 93408
Contact: John Hollenbeck, Project Manager
jhollenbeck@co.slo.ca.us (805) 781-1288



SOURCE: County of San Luis Obispo

Nacimiento Water Project . 204453
Figure 1
 Nacimiento Water Project Location

2.0 Potential Project Impacts

Oak Woodlands are a major component of San Luis Obispo County's rural landscape. The EIR has identified valley oak, blue oak, and coast live oak species and woodlands in and immediately adjacent to the NWP (MRS, 2003). The Project's construction will encounter and impact each of these woodland types in addition to individual trees of each species. For purposes of species distinction and mitigation planting, the distinguishing characteristics of each type are discussed below.

Valley Oak (*Quercus lobata*) Woodland. This habitat occurs in a wide range of settings, but is primarily encountered on deep, well-drained alluvial soils on valley bottoms and on non-alluvial soils within the coastal range. Valley oak woodlands often act as a transition between valley oak riparian forest and valley oak savanna. Individual trees may reach over 100 feet high. Valley oak woodland mixes with valley oak riparian forest near rivers and with blue oak woodland in drier locations.

Blue Oak (*Quercus douglasii*) Woodland. Blue oak woodlands are typically associated with shallow rocky, infertile, well-drained soils. Blue oaks are well adapted to dry, hilly terrain where the water table is unavailable. Blue oak woodlands can exist within valley oak woodlands, but generally occur in drier areas on northern slopes. Blue oaks have a high drought tolerance and compete very successfully with other tree species in drier locations. This habitat varies from open savanna to dense woodland and is typically found in the valleys and foothills of the coastal ranges.

Coast Live Oak (*Quercus agrifolia*) Woodland. These woodlands are highly variable and comprise slow growing, long lived trees. They exist within 15 different soil types in San Luis Obispo County, generally occurring in moderately to well-drained soils that have low to medium fertility. On steep slopes, coastal live oaks establish themselves in small woodland patches. The under story can vary from annual grasslands to dense shrubs.

2.1 Potential Construction Impacts

- Damage to individual trees or oak woodlands during construction activities or staging of equipment and materials.
- Damage to individual trees during trimming or root pruning activities.
- Damage to tree roots during construction activities including trenching, auguring, or staging of equipment and materials.
- Removal of dead or downed oak logs during preconstruction ROW clearing.

Mitigation measures to limit the listed potential impacts are described in Section 6.0.

2.2 Pre-Construction Site Assessment

In 2003 and 2006 an inventory of oak trees and oak woodlands was conducted along the pipeline right of way (ROW) by field reconnaissance and review of aerial photographs. The oak species documented within the project areas are blue oak, coast live oak, and valley oak. Within the construction ROW and staging areas, a total of 3.72 acres of oak woodland (MRS, 2003) and 1,785 individual trees were identified. The location and potential impacts to oak woodlands are described in **Table 1**.

Where possible, the construction ROW will be restricted to a maximum width of 30 feet to avoid sensitive resources including oak trees and oak woodlands. Less than 500 trees were originally anticipated to be removed during construction; additional trees will be impacted by trimming during the NWP. For purposes of this Plan, approximately 1,700 mature oak trees were identified as having the potential to be impacted (see section 4.1). The actual number of individual trees impacted or removed by the Project will be documented during construction by the Biological Monitor (ESA, 2006) and will be replaced through mitigation plantings.

TABLE 1
POTENTIAL IMPACTS TO OAK WOODLAND BY LOCATION AND ACREAGE AREAS

Project Station Location ^a	Type of Oak Woodland	Areas Acreage	Number of Areas	Notes
165+00-170+00	Blue Oak Woodland	0.23	1	Blue oak dominate, coast live oak present
250+00	Blue Oak Woodland	0.05	1	Located at P11
W. Perimeter at CMP (P21) to fire Break Trail (P25)	Blue Oak Woodland	0.02	1	Located after P18
One-Way Tank Line	Blue Oak Woodland	0.17	1	Access road to tanks
Fire Break Trail (P25) to Camp Roberts Boundary (P29)	Blue Oak and Valley Oak Woodland	0.05	1	Located at P27
Camp Roberts Boundary (P29) to Mahoney Road (P30)	Blue Oak Woodland	0.05	1	At P30 (creek)
665+00. Mahoney Road (P30) to Texas Road Intersection (P32)	Blue Oak Woodland	0.24	2	At creek. Blue oak dominate, valley oak and coast live oak present.
Salinas River (P68)	Valley Oak Woodland	0.02	1	Microtunnels start, P66 to P69
Salinas River (P71-P73)	Coast Live Oak Woodland	0.30	4	Coast live oak dominate, valley oak present. Microtunnels end, P70 to P74
Vaquero Drive (P76) to TCSD Discharge (P78)	Valley Oak Woodland	0.17	1	Valley oak dominate, coast live oak and blue oak present. At P78, TCSD discharge area access road
TCSD Discharge area (P78-P80)	Valley Oak Woodland	1.55	2	Valley Oak dominate, coast live oak present. At P79C (Salinas River riparian)
1685+00-1690+00.	Valley Oak Woodland	.028	1	P81 to Atascadero Treated Water Connection
1760+00	Valley Oak Woodland	0.11	1	Atascadero Treated Water Connection to Halcon Road (P85). Valley oak dominate, coast live oaks present.
Rocky Canyon Storage Tank (P84)	Blue Oak Woodland	0.11	1	At tank site.
2500+00	Coast Live Oak Woodland	0.14	1	Stenner Creek Road (P111-P112).

^a All project station numbers correspond to the original design period. Station numbers will be re-assigned during the final design phase.

SOURCE: AMEC Earth and Environmental, Draft Biological Resources Report to the Proposed Nacimiento Water Project. November 2001.

3.0 Monitoring Plan

The NWP Oak Tree Mitigation & Monitoring Program (OTMMP) described in this section is designed to ensure the protection of oak species and oak woodland habitats, document the trimming or removal of oaks by the Project, and identify guidelines for oak replacement and mitigation planting.

3.1 Preconstruction Identification and Flagging

During the final design phase many of the individual oak trees will be avoided, where possible, by reducing the construction corridor from a width of 100 feet to 30 feet. The oak trees and woodlands will be clearly marked on the engineering drawings and flagged in the field as sensitive resource zones. Prior to ground disturbing or staging activities, the Biological Monitor will identify all oak trees within the corridor to be avoided, trimmed, or removed using different colored flagging and a sequential numbering system. The location and species of each tree will be documented using engineering stationing and GPS coordinates. An accurate record of avoidance, impact, or removal activities will be completed as construction progress.

3.2 Avoidance and Monitoring During Construction

Avoidance. The construction corridor will be narrowed where possible from 100 feet to a maximum of 30 feet to avoid individual oak trees and oak woodland stands. The corridor and sensitive resource zones will be clearly marked on the engineering drawings and will be flagged in the field by the Biological Monitor or designated construction monitor. The woodland canopy and individual trees immediately adjacent to construction areas will be protected by the contractor prior to construction by erecting temporary fencing around the outside edge of the tree's drip line. Construction access roads, ROW access points, and equipment or materials staging areas will be located away from oak woodlands and shall avoid individual oak trees, as feasible. Equipment, vehicles, and materials will not be staged under an oak tree's dripline. The relocation or removal of dead or downed logs will be avoided to the extent possible during ROW clearing and site preparation.

Trimming and Pruning. Any necessary oak tree trimming will be conducted under the supervision of a certified arborist and must conform to the standards set forth by the International Society of Arboriculture. All cuts will occur at the branch collar using natural target pruning; the practice of stub cuts, topping, flush cuts, and random branch removal will be avoided. The use of a tree seal is not permitted.

Mechanical digging and blade or grading work under the drip lines of standing live or dead oak trees shall be avoided when possible. If practical, digging under the drip line of oaks will be done by hand digging, auguring, or boring. Major roots will be avoided whenever possible. If root trimming is unavoidable, all roots larger than 1 inch in diameter will be clean cut. Any damage to an oak tree's limbs or roots, which results in the mortality of the tree, will be subject to replacement planting (3:1 ratio).

Removal. The Biological Monitor must establish the current status of Sudden Oak Death (*Phytophthora ramorum*) at the time tree removal takes place. If SOD is present, strict guidelines will be necessary to minimize or avoid the introduction, build-up, or spread of SOD. Best Management Practices (BMPs) would include inspecting vehicles leaving the site for host plant debris (leaves, twigs, and branches), power washing stations for trucks, etc.

Construction Monitoring. An onsite monitor will use aerial maps and pre-construction documentation to identify and track the construction activities near or adjacent to individual trees and oak woodlands.

The Biological Monitor will:

- Ensure sensitive zones are protected by temporary fencing and individual trees are clearly flagged in the field prior to the start of construction activities;
- Ensure all construction personnel have received the Project's Worker Environmental Training and are aware of the protective measures related to oak trees and oak woodlands;
- Monitor construction activities to ensure fill, excavated soil, staged equipment or materials are not placed within the drip line of all oak trees;
- Monitor construction activities to ensure no fasteners are used on the trees;
- Record the actual avoidance, trimming, or removal activities for each flagged oak tree; and
- Record the trimming or removal activities of any unflagged oak trees within the ROW or those that occur immediately adjacent to the ROW. Document the tree species and location (engineering stationing and GPS coordinates).

The biological monitors function as facilitators and record-keepers. The monitors will complete a *Daily Monitoring Report* for each day spent monitoring construction on the Project, as described in ESA (2006). This form is used to document the type of construction activities monitored, the actions and observations of the monitor, and the general level of compliance.

3.3 Post Construction Monitoring

The Biological Monitor will conduct oak monitoring one year after the completion of construction. The monitoring will include reconnaissance of all trees immediately adjacent to or within the ROW and staging areas that were avoided or trimmed during construction activities.

If any oak tree died either during construction or within one year after the completion of construction, the tree shall be replaced at a 3:1 ratio. A monitoring report will be drafted to include the tree species and its location (engineering stationing and GPS coordinates) and will be included in the annual Oak Tree Mitigation and Monitoring report (see below).

3.4 Oak Tree Mitigation Monitoring

The Oak Tree Mitigation and Monitoring program provides guidelines for the implementation of the mitigation for individual oak tree and oak woodland losses that occur during the construction of the NWP.

Prior to planting, an Oak Mitigation Monitor (OMM) shall be retained by the District. This person shall be a qualified biologist, restoration ecologist or restoration consultant.

The OMM shall be responsible for:

- Supervising site preparation;
- Approving all seedlings prior to installation;
- Overseeing installation, including training and directing planting crews if necessary;
- Monitoring oak mitigation planting progress and reporting to the District and/or regulatory agencies, as necessary;
- Providing guidance and instruction to the District for ongoing maintenance to ensure the long-term successful establishment of the oak plantings. If necessary, the OMM will train maintenance crews in the methods presented in this plan;
- Guiding remedial actions as needed to replace seedlings, so that performance criteria and mitigation requirements are met; and
- Ensuring that non-native species removal complies with all state and federal requirements and training maintenance crews in proper techniques and best management practice for weed control if necessary.

Reporting Requirements. Once construction is complete, a final construction report (Oak Tree Mitigation and Monitoring Report) will be submitted to the permitting agencies, if requested. This report will identify the species and location of each oak tree trimmed or removed during construction activities. The report will include mapping of trees and photo documentation examples of trimming or tree removal activities during construction. Additional oak tree or woodland impacts not anticipated during pre-construction flagging and labeling will be identified and included in the total oak tree impact quantification.

In addition to the Final Construction Report, the District may be required to submit annual Oak Tree Mitigation and Monitoring reports to the permitting agencies by February 1 of each year for seven years or as otherwise required by permits and agreements issued for the project.

The first year's report will summarize the baseline information as well as the first year monitoring results. Thereafter, annual reports will consist of a summary of information contained

in previous reports, as well as a presentation of the current year's results and discussion of any comparisons between years or trends noted.

The monitoring reports will evaluate the success of the project against the performance criteria. Monitoring will occur twice a year in the spring and fall. The monitoring data will include:

- Recording of individual's tree tag number, height, and basal diameter;
- Qualitative information such as tree health (poor, marginal, healthy) or mortality;
- Maintenance recommendations or remedial actions; and
- Permanent photo locations will be established during baseline monitoring and identical color photographs will be taken each year during the spring monitoring period. The photos can be compared to qualitatively assess changes in general site conditions.

The annual Oak Tree Mitigation and Monitoring reports will include, at the minimum, the following information:

- Summary description of the monitoring methods, including data collection and analysis;
- An overview of the mitigation planting effort, including a general discussion of site conditions, changes since previous report, and quantitative statistics (average growth by species and survival percentages);
- Analysis of success in relation to performance standards;
- Color photographs of the planting areas taken from the established photo locations on the ground and standardized with respect to direction, lens type, etc.;
- A map of the area with relevant features;
- Copies of all data sheets employed in the data gathering; and
- A discussion of any corrective actions needed or undertaken (including weed control, protective cage maintenance, and replanting).

4.0 Mitigation Plan

4.1 Pipeline Construction and Offsite Mitigation

Outside Camp Roberts' boundaries nearly 1,200 mature oak trees were identified as having the potential to be impacted or removed by the NWP. While the ROW will be narrowed, as feasible, from 100 feet wide to 30 feet wide in sensitive resource zones to avoid individual oak trees and oak woodlands, substantial canopy and/or root trimming or removal of oaks is anticipated.

At the completion of construction, the final total of individual oak trees removed will be determined. At that time, the actual acreage for mitigation plantings will be calculated by the Project biologist.

Potential Planting Sites. Replacement planting to mitigate for these losses will occur offsite at multiple locations. A total of approximately 66 acres would be needed to accommodate the mitigation trees to be planted based on the upper estimate of potential trees to be removed; actual numbers of trees to be removed are anticipated to be substantially less. Four potential planting sites, owned by the County of San Luis Obispo, may be suitable for planting of the oak species.

- Santa Margarita Lake Regional Park has several thousand acres designated as open space which may be suitable for a percentage of the oak plantings. The planting sites at this location are limited by some areas' inaccessibility during the establishment period.
- Heilmann Regional Park in Atascadero may be most suitable for blue oak planting as blue oak woodlands exist within the park. Approximately 10 to 15 acres may be suitable for mitigation planting.
- Duveneck property in Templeton was recently donated to the County of San Luis Obispo and has valley oaks on the lower river terrace, and possibly blue oaks on the upland slopes of the property. Approximately 10-14 acres may be suitable for mitigation planting.
- A 50 acre parcel (PPN 073-291-003) owned by the City of San Luis Obispo near the Cuesta Tunnel's south portal currently supports oaks and woodland habitat. Approximately 20 to 25 acres may be suitable for mitigation planting.

Additional properties such as Big Sandy owned by California Department of Fish and Game may also be available for mitigation planting and will be identified in the future.

Replacement Ratio. All individual oak trees removed outside of woodland habitats which are greater than 6 inches in diameter at breast height (dbh) will be replaced at a ratio of 4:1. The Project EIR identified 74 individual trees to be trimmed or removed during construction activities near or within oak woodlands (AMEC Earth and Environmental 2001). Individual oak trees removed from oak woodland habitat (see Table 1) will be replaced at a 3:1 ratio.

Replacement of Mitigation Plantings on Central Coast Water Authority (CCWA) Land.

To the west of Highway 101 along the Cuesta Grade, CCWA maintains 32 acres of blue oak, coast live oak, and valley oak mitigation plantings. These oaks are mitigation for impacts associated with the installation of the Coastal Branch Aqueduct Expansion Project by the Department of Water Resources (DWR). As per CCWA's agreement with CDFG, valley oaks were mitigated at a ratio of 10:1. Blue and live oaks were mitigated at a ratio of 3:1. Any impacts or removal of individual oaks on this property will require a replacement ratio of 1:1. Additionally, the District will assume the maintenance and successful growth performance criteria for these replaced oaks, as set forth in CCWA's agreement with CDFG.

4.2 Construction on Camp Roberts and Onsite Mitigation

Of the 1,785 oak trees identified within the ROW using aerial maps in 2006, approximately one-third (~500) are located on Camp Roberts. The construction ROW is restricted primarily to established roads, therefore the majority of mature oak trees can be avoided during construction. Only a small percentage are anticipated to be trimmed or removed during the pipeline's installation.

A large number of oak seedlings and saplings grow near the edge of the roads, particularly in areas with steep sloped cuts. Seedlings and saplings, regardless of diameter at breast height (dbh), are counted as trees and require mitigation to replace their loss. Potential planting areas on Camp Roberts are described in Table 2.

TABLE 2
POTENTIAL PLANTING SITES ON CAMP ROBERTS BASE

Project Station Location^a	Acreage	Notes
130+00-135+00	1.72	Proposed staging area and adjacent to flat areas. 250' x 150' on north side. Second area south of the alignment adjacent to flat areas.
160+00-165+00	0.86	Sloped area. 75' x 500'
230+00-235+00	2.30	Proposed flat staging area on north side. 100' x 300'. South side adjacent to corridor. 100' x 700'
355+00	1.03	Proposed staging area. 150' x 300'
405+00	2.30	Adjacent to the pipeline alignment. 100' x 700'.
410+00-415+00	2.87	Proposed staging area and area to the northeast. 250' x 500'.
450+00	1.38	Sloped area south of alignment. 600' x 100'.
485+00-490+00	0.92	Proposed staging area north of and south of the alignment. Additional area south of the road. 800' x 100'.
505+00	0.92	Proposed staging area and sloped areas adjacent to the alignment. 400' x 100' on both sides of the road.

Project Station Location ^a	Acreage	Notes
520+00	0.30	Proposed staging area and sloped areas with mature trees immediately adjacent to the alignment.
Total Acreage	14.6	

^a All project station numbers correspond to the May 2006 design period. Station numbers may be re-assigned during the final design phase.

SOURCE: ESA. 2006.

These areas total 14.6 acres of suitable habitat located close to the pipeline, and therefore, close to the sources of oak impacts. This amount of area would accommodate approximately 1,000 mitigation trees. Although not adequate for the number of trees required according to the upper estimate of potential oaks to be removed, the actual number is anticipated to be substantially lower due to avoidance efforts. Additional planting areas will be identified in the future, if needed.

Potential Planting Locations. Several locations adjacent to the pipeline alignment may provide suitable areas for infill planting between the roads and existing oak woodlands. While one large mitigation area is preferred from the standpoint of maintenance efficiency, these multiple locations are accessible from the road. Water for irrigation is available at a central location on the base, and would be delivered to the planting areas using a tanker or “water buffalo” (trailer-mounted watering rig).

Because Camp Roberts is an active training facility, the mitigation planting locations are anticipated to be available for training exercises in the future. Any proposed planting area must meet the following conditions prior to approval by the Camp Roberts Environmental Office (CAEV-CR):

- Sloped areas are preferred over flat areas for planting. Flat areas are used heavily for training exercises and are more likely to be impacted by the exercises. The CAEV-CR’s approval for flat area planting is on a site by site basis;
- Planting areas cannot be fenced to protect against browsers (deer, pigs, and elk). Fences are considered permanent by Camp Roberts and may limit the availability of training areas and exercises. The use of tree cages or planting tubes is permissible; and
- Plantings should be in close proximity to mature oak trees and at the edges of existing stands. The presence of mature oaks illustrates the area’s ability to support oak tree growth in that area.

The potential planting areas shown in **Table 2** have been reviewed by CAEV-CR’s staff for conflicts with training areas or potential impact to cultural resources, sensitive plants, and vernal pools. The potential planting areas currently meet CAEV-CR’s conditions for planting.

Replacement Ratio. On the Camp Roberts base, all oak seedlings, saplings, and mature trees that are removed or die as a result of project construction within one year of completion of major construction activities will be replaced at a 3:1 ratio. This includes all seedlings and saplings less than 6 inches dbh and saplings greater than 6 inches dbh.

4.3 Performance Criteria and Completion of Mitigation Requirements

Performance Criteria. Oak seedlings planted to offset the impacts by the NWP at offsite locations or on Camp Roberts' property will meet the following performance criteria. These criteria are consistent with CCWA's mitigation performance criteria. The duration of the monitoring will be seven years or when the oak plantings have:

- A basal diameter of 2 inches or a height of 6 feet;
- Survived one year without protective cages; and
- Survived two years without supplemental watering or irrigation.

Completion of Mitigation Requirements. Once the performance criteria have been met for an individual oak tree, annual monitoring for that individual will cease. The oak tree will be photographed and its tree tag and weed mat removed. Its successful completion will be documented in the annual Oak Tree Mitigation and Monitoring report.

4.4 Acorn Collection and Germination

Acorn Collection. Oak seedlings will be propagated from local acorn sources from within the Nacimiento or Salinas watersheds, preferably from within the removal and planting site's watershed. Permission of the property owner must be obtained prior to the collection of plant materials.

- The acorns from blue and valley oaks ripen earlier than coast live oak acorns. Blue and valley oak should be collected in late August until mid-October. Coast live oak acorns should be collected in early September until Mid-October;
- If acorns are not ripe, the caps will be difficult to remove from the acorn. Once picked, immature acorns cannot be ripened artificially. Acorns should be collected, sorted, and stored by species. Document the collection location (GPS coordinates);
- When possible, collect acorns directly from the branches of the trees, rather than from the ground. Tree collected acorns may have better germination rates than those collected from the ground. Do not damage the tree limbs while collecting the acorns;

- Acorns collected from the ground should be sorted using the float test method to check for viability. The float test is a simple method to identify acorns that may be immature, hollow, or damaged. Place the acorns in a bucket of water and after several hours in the water, discard any floaters;
- Coast live oak acorns require stratification prior to sowing. Soak coast live oak acorns in water for 24 hours and place in a cooler or refrigerator for 30 to 90 days before sowing;
- Prior to storing, remove the acorn's caps. Acorns should be stored in a re-sealable plastic bag in a refrigerator or cooler at temperature just above freezing (between 33.8° F and 37.4° F). Plastic bags act as moisture barriers while permitting necessary gaseous exchange, and preventing moisture accumulation;
- For greatest viability, blue and valley oak acorns should not be stored for more than 1 or 2 months before planting. If acorns start to germinate during storage, remove and plant them as soon as possible; and
- Discard any acorns whose radicles have become discolored or moldy during the storage period.

Germination and Container Seedlings.

- Acorns will be pre-germinated and outplanted when their radicles reach ¼ inch to ½ inch in length;
- Grow oak seedlings in tall and narrow containers. If necessary, transplant seedlings into deeper containers before seedlings become 'pot-bound' to prevent root circling;
- Use a coarse, well-drained, potting mix that includes organic amendments including bark products and peat, native soil, perlite, vermiculite, and sand. Soil should be kept moist, but not saturated;
- Incorporate a slow release fertilizer into the potting mix to improve seedling nutrition;
- To improve moisture and nutrient uptake, provide mycorrhizal inoculation; and
- If nursery stock is necessary, a native plant nursery with experience propagating oak seedlings will be retained by the District to provide locally collected acorns for mitigation plantings. The nursery must be approved by the Project biologist and by Camp Roberts' Environmental Office (CAEV-CR), if applicable.

4.5 Outplanting of Seedlings

Planting Schedule

- Seedlings should be less than 1 year old at planting time;
- Coast live oak acorns collected in October should be sown in containers in December, and planted no later early March; and
- Blue and valley oaks, which germinate sooner than coast live oak acorns, should be planted before the end of January to ensure the highest viability rates possible.

Planting Scheme

- Planting locations suitable to each species' long-term sustainability will be finalized by the OMM in collaboration with the District representative and a representative of Camp Roberts CAEV-CR once the sites have been identified and acquired by the District;
- Plant locations will be marked in the field by colored pin flags. Seedlings will be planted to avoid a linear arrangement;
- Seedlings will be planted in clusters of 10, spaced approximately 20 feet from each other. A distance of 50 feet will be established between each clustered grouping;
- Planting shall adhere to the minimum spacing requirements; and
- Where possible, planting locations will be accessible by a water tanker or "water buffalo" so that supplemental watering is feasible.

Site Preparation and Planting

- All existing trees in the planting areas will be retained and protected from damage during site preparation and planting;
- At each planting location, a diameter of 4 feet will be cleared of all vegetative ground cover;
- A shovel, auger, or post hole digger will be used to break up soil through the compacted zone (approximately top 12 inches of soil);
- Planting hole depth for planting trees and shrubs shall be 1½ times deeper than the depth of the tap root and will be deep enough to prevent the upturning of the taproot ("J-rooting"); and
- Prepare the hole with a combination of native soil and potting mix. Place a slow-release fertilizer tablet 3 to 4 inches below the seedling's roots. The inclusion of a polymer to increase moisture retention (TerraSorb) may be placed in the hole prior to backfilling the

hole. The use of TerraSorb or similar product may reduce plant shock associated with drought while enhancing soil aeration.

- A polypropylene landscape fabric cut into 3 foot by 3 foot squares will be placed around each seedling at the time of planting to discourage weed growth. Secure the polypropylene fabric using heavy gauge 6 inch wire staples.
- The polypropylene fabric will be covered with a 5- to 7-cm thick layer of organic mulch (waste wood chips).

Tree Tubes and Protective Cages

- To prevent damage and browsing by deer, cattle, rabbits, rodents, and insects, tree tubes and protective cages will be installed around each seedling;
- Tree tubes with UV inhibitors should be used to decrease degradation in sunlight and increase the life of the tube;
- Netting will be secured overtop of the tree tube to prevent insect or bird penetration. Netting can be removed once the seedlings height has reached the height of the tube;
- Tree tubes at least 2 feet in height will be installed with two 1x2" stakes to hold them upright and prevent seedling or sapling damage in strong winds;
- Tree tubes will be maintained and left in place for a minimum of three years after seedlings have grown out of the tops to ensure strong trunk development prior to removal;
- Protective cages to prevent browsing and damage by cattle and deer will be constructed using a 5 foot length of 4" x 2" inch galvanized fencing;
- Each cage will be secured on one side by a steel T-post and on the opposite side by a length of rebar. The T-post and rebar should be driven into the soil at a depth of at least 12 inches. The cages will be set at least 8 inches below ground; and
- The final height of the protective cage will be at least four feet above ground level.

Tree Tags

- Each tree will be identified by a tree tag attached to its base inside of the tree cage;
- The tree tags may be either metal or polyurethane and must be attached loosely to the tree in a manner that will not incur damage to the seedling during its transition to sapling; and
- The tag's numerals should be imprinted and highly visible.

4.6 Planting Maintenance

During the first three years of implementation, the mitigation planting sites will be visited at least once a month by the planting contractor to conduct site maintenance.

Weeding

- Every spring, annual weeding will be conducted at each planting site;
- For subsequent seasons, an evaluation will be made at the time of monitoring. If it is determined that weeds are a threat to the attainment of performance standards, further weed control shall be implemented at the direction of the OMM;
- Weeds that occur in the planting area shall be removed by hand or by hand tools only (electric or gas powered weed-eaters may be used);
- No weeding shall occur outside of areas specified by the OMM; and
- All weeded plant materials shall be bagged on-site and disposed of off site in a responsible manner (i.e., at an authorized landfill or recycling-composting center). No weeded materials shall be stored on the site or allowed to spread further.

Supplemental Watering

- Provide supplemental watering in the form of infrequent, deep irrigations (at least two gallons per planting) rather than frequent, shallow irrigation. For the first three years, supplemental watering will occur at each planting location every four weeks between May through October. Dependent upon soil moisture and rainfall, supplemental watering may be necessary between November and April; and
- Irrigation shall be cut back gradually beginning in the third fall and winter season after planting to reduce and eventually eliminate the saplings' dependency on irrigation.

Protective Measure Maintenance

- For the first three years, damage to tree shelters, cages, tags, and polypropylene fabric will be documented and repaired during monthly site visits by the planting contractor.
- Upon detection, protective measures that may have been removed either by wildlife or vandals will be replaced immediately.

Site protection

- Areas that have been designated as oak mitigation planting sites will be clearly demarcated by a sign and other measures, as directed by the District, to protect the areas during the establishment phase and to prevent damage to the areas.

4.7 Release of the Planting Contractor

- Following installation, all plantings will be guaranteed by the planting contractor for a period of one year. All dead or damaged trees will be replaced by the contractor as part of the monthly site maintenance.
- At the end of the guarantee period, the planting sites will be evaluated by OMM and District representative prior to releasing the contractor of contractual obligations.

5.0 Authors and References

5.1 Report Authors

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6.0 Mitigation Measure BR-10 of the Nacimiento Water Project EIR (MRS, 2003)

Construction techniques to be implemented to protect oak trees and oak woodlands (i.e., blue oak woodland, valley oak woodland, coast live oak woodland, and digger pine oak woodland):

- In accordance with the County's guidance on oaks and Assembly Bill No. 242 to add Article 3.5 to Chapter 4 of Division 2 of the CDFG Code relating to oak woodland conservation, and with all local related policies and ordinances (e.g., City of Paso de Robles Oak Tree Preservation Ordinance, Camp Roberts Integrated Natural Resources Management Plan) the final project design shall target maximum avoidance of oak trees. If avoidance is not feasible the Applicant shall prepare an Oak Tree and Woodland Mitigation plan, which shall be prepared by a certified arborist and shall contain but not be limited to the following measures:

- a) The construction ROW easement shall be narrowed to a maximum of 30 feet in width through oak woodland habitat (i.e., areas suitable for the establishment of oak woodlands). During final design, the project biologist and project engineer shall identify the most appropriate location for the narrowed corridor, taking into account the preservation of as many individual oak trees as possible with the engineering requirements of the proposed project. All areas requiring this sensitive resource zone shall be clearly shown on all construction plans, and prior to the onset of construction, flagged by the project biologist/construction monitor. If determined necessary by the County Environmental Coordinator, a preconstruction survey shall be conducted by the project biologist to accurately map oak woodlands that would be unavoidably impacted.
- b) Construction machinery ingress, egress, and staging areas shall be placed away from woodlands and individual oak trees, and shall not be driven under the canopies of oak trees.
- c) Disposal or storage of fill or excavated soil is prohibited within the drip line of all oak trees.
- d) During construction near oak trees, no fasteners may be used on the trees.
- e) All reasonable measures shall be taken to avoid moving dead or downed oak logs.
- f) All oak trees immediately adjacent to construction areas shall be protected by erecting temporary fencing at the drip line of the woodland canopy or around individual trees.
- g) Any necessary oak tree pruning shall conform to the standards of the International Society of Arboriculture and done under supervision of a certified arborist. Pruning shall be carried out in such a manner as to maintain a natural looking tree form upon completion of pruning; practices such as stub cuts, topping, flush cuts, and random branch removal shall be avoided. All pruning cuts shall correspond with the branch collar using natural target

pruning, and no tree seal shall be used. Pruning or cutting of roots, etc. of individual trees shall be quantified during construction and up to one year after construction.

- h) Oak monitoring shall be done for one year after construction completion. If any oak trees die either during construction or within one year after construction completion, the trees shall be replaced at a 3:1 ratio.
- i) Individual oak trees that cannot be avoided and must be removed within habitat types other than oak woodlands shall be replaced at a 4:1 replacement ratio in accordance with the County's mitigation policy for loss of individual oak trees.
- j) For every area of oak woodland habitat that is removed, oak woodland habitat shall be restored onsite or replaced offsite at an agreed upon offsite location with an equal area (3:1 replacement ratio).
- k) Offsite replacement for oak woodlands shall be at locations that currently support disturbed or nonnative habitats. Each of the four oak woodland habitat types that would be disturbed shall be replaced and restored with a similar density of oak trees by species as found in the impacted habitats. The Flood Control and Water Conservation District (FCWCD) shall prepare a detailed oak woodland restoration plan for this project. The VRRP shall contain detailed information on oak woodland restoration replacement and address any issues of concern. Areas suitable for creation of oak conservation areas for replacement offsite shall be evaluated. Feasibility of purchasing land for oak conservation shall be evaluated.
- l) Specifically on Camp Roberts and Camp San Luis Obispo, compliance with the Camp Roberts Integrated Natural Resources Management Plan (INRMP) is required as follows:
 - hand digging, mechanical digging, and blade work are prohibited under the drip lines of standing live or dead oak trees; if digging under the drip line of oaks is unavoidable, any damage that ensues will be subject to mitigation (replacement);
 - 3:1 replacement for damaged or removed oaks;
 - collection of acorns from the area of impacted oaks, planting at densities approved by CA ARNG, planting during January-February, watering if necessary;
 - minimum of five (5) years of monitoring, 3:1 survivorship ratio, preparation of annual monitoring reports, and compliance with all other INRMP oak management stipulations.
- m) These oak tree avoidance and monitoring procedures shall also be followed for construction in all areas in the vicinity of oak trees along the construction route.